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STUDIES IN CYPERACEAE IN SOUTHERN AFRICA: VI.

A NEW COMBINATION IN *FUIRENA* WITH NOTES ON THE SPECIES

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ABSTRACT

A new combination, *Fuirena hirsuta* (Berg.) P. L. Forbes, is made. A description, citation of specimens, illustrations and notes on variability within this species are given.

Fuirena hirsuta (Berg.) P. L. Forbes, comb. nov.
Cyperus hirsutus Berg., Descr. pl. Cap. B. Spei: 11 (1767); Roem. & Schult., Syst. **2:** 225 (1817); Kunth, Enum. P1. **2:** 114 (1837).

Fuirena hirta Vahl, Enum. P1. **2:** 387 (1805); Spreng. in Linn., Syst. Veg. 16, **1:** 236 (1825); Schrad., Anal. Fl. Cap.: 52 (1832); Nees, Linnaea **7:** 510 (1832), Linnaea **9:** 288 (1834) name only, and Linnaea **10:** 142 (1835–36); Kunth, Enum. Pl. **2:** 181 (1837); Boeck., Linnaea **37:** 108 (1871–3); Clarke in Dur. & Schinz, Consp. Fl. Afr. **5:** 647 (1894) name only, in Dyer, Fl. Cap. **7:** 264 (1898) and Bull. Misc. Inf. Add. Ser. **8:** 116 (1908) name only; Schonland, S.A. Cyp., Mem. Bot. Survey S. Afr. **3:** 52, pl. 55 (1922); Dyer, Rec. Albany Mus. **3:** 481 (1927) ecological note only; Muir, Vegetation of Riversdale area, Mem. Bot. Survey S. Afr. **13:** 34 (1929) ecological note only. *F. cephalotes* Schrad., Goett. Gel. Anz. **3:** 2071 (1821). *F. erioloma* Nees, Linnaea **9:** 288 (1834) name only, and Linnaea **10:** 142 (1835–6); Kunth, Enum. Pl. **2:** 181 (1837). *F. glabra* Kunth, Enum. Pl. **2:** 182 (1837); Boeck., Linnaea **37:** 101 (1871–3); Clarke in Dur. & Schinz, Consp. Fl. Afr. **5:** 646 (1894) name only, in Dyer, Fl. Cap. **7:** 264 (1898), Bull. Misc. Inf. Add. Ser. **8:** 116 (1908) name only, and Illus. Cyp. tab. 59, 11 (1909). *F. intermedia* Kunth, Enum. Pl. **2:** 181 (1837); Boeck., Linnaea **37:** 101 (1871–3). *F. hottentotta* (L.) Druce, Rep. Bot. Exch. Cl. Brit. Isles 1916: 623 (1917); Fourcade, Checklist fl. pl. of divs. George, Knysna, Humansdorp and Uniondale, Mem. Bot. Survey S. Afr. **20:** 85 (1940) name only; Levyns in Adamson & Salter, Flora of the Cape Peninsula: 118 (1950); Martin & Noel, Flora of Albany and Bathurst, Rhodes Univ., Grahamstown: 15 (1960) ecological note only.

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Scirpus hottentottus Linn., Mant. Pl.: 182 (1771); Rottb., Descr. & Icon. Pl. **1:** 54, tab. 16 fig. 4 (1773); Linn., Syst. Veg. **14:** 101 (1784); Thunberg, Prodr. Pl. Cap.: 18 (1794), Fl. Cap. **1:** 370 (1807) and Fl. Cap. ed. Schult.: 98 (1823). *S. glaber* (Kunth) T. Koyama, Journ. Fac. Sci. Univ. Tokyo **7** (6): 287 (1958).

Perennial, erect, 10—109 cm in height, generally 40—60 cm: *rhizome* horizontal, tough, woody, 3—8 mm across; scale leaves deltate or shallowly triangular, brown, striate, glabrous or sometimes puberulous, often torn: *culms* contiguous or up to 2 cm apart on rhizome, 2—7 mm across at base, leafy, triangular to terete, glabrous throughout, or glabrous or sparsely hairy below, becoming hirsute distally: *sheaths* shorter than internodes, hirsute to glabrous: *ligule* a membranous collar, usually hirsute, sometimes puberulous or glabrous, mouth slightly oblique; *blade* up to 28 cm long, 9 mm wide, generally 10—15 × 0·4 cm, longer than internodes, reduced or absent at base of culm, firm, more or less erect, hirsute, or sparsely hirsute to sub-glabrous when hairs on midrib and margin, or margin only, apex acuminate, acute in reduced blades: *inflorescence* terminal, of 1—3 heads, second and third heads, if present, subsessile or with hirsute peduncle up to 2·5 cm long, rarely with 1—2 additional long-stemmed lateral heads from node below terminal inflorescence, heads 0·6—2 cm, generally 1·5 cm across, globose, congested, echinate owing to long awns of glumes; bracts usually 2—3, unequal, longer or shorter than inflorescence, hirsute, sometimes sparsely so, often at base only: *spikelets* up to 8 mm long, 4 mm wide, generally 6 × 3 mm excluding projecting awns, ovate to oblong, not ranked, spicular: *glumes* numerous, lowest two only sterile, upper of which short, bicarinate, nerves 2 or indistinct, apex obtuse, truncate or slightly bilobed, muticous; remaining glumes about 5 mm long including awn, puberulous abaxially with numerous, sparse, or without long stiff hairs in distal half and on awn, body oblong, oblong-obovate, or oblong-elliptic, length 1½—3 times width, keel rounded, excurrent into awn 1·5—2 mm long, subterminal, straight or recurved: *bristles* 3, rarely absent, opposite stamens, length usually from slightly shorter than scale claw to about half total scale length, sometimes up to 2½ times scale length, rigid, or soft and delicate, hairy, hairs mainly antrorse: *scales* 3, alternate with bristles, forming an inner whorl more or less equal to ovary and beak in length, unguiculate, aristate; claw woolly when mature, hairs absent in young flowers; blade oblong, square, elliptic, broadly elliptic or oblong-obovate in mature flowers, narrowly obovate when young, nerves 3, usually dark brown prominent, occasionally pale brown or opaque white, blade base truncate, obtuse or acute, lateral margins usually ciliate, rarely smooth or with sparse hairs, apex acute or obtuse, swollen, puberulous; awn antrorsely and extrorsely hairy: *stamens* 3, anther crest small, obtuse or acute, sometimes elongate then smooth or antrorsely scabrid: *achene*

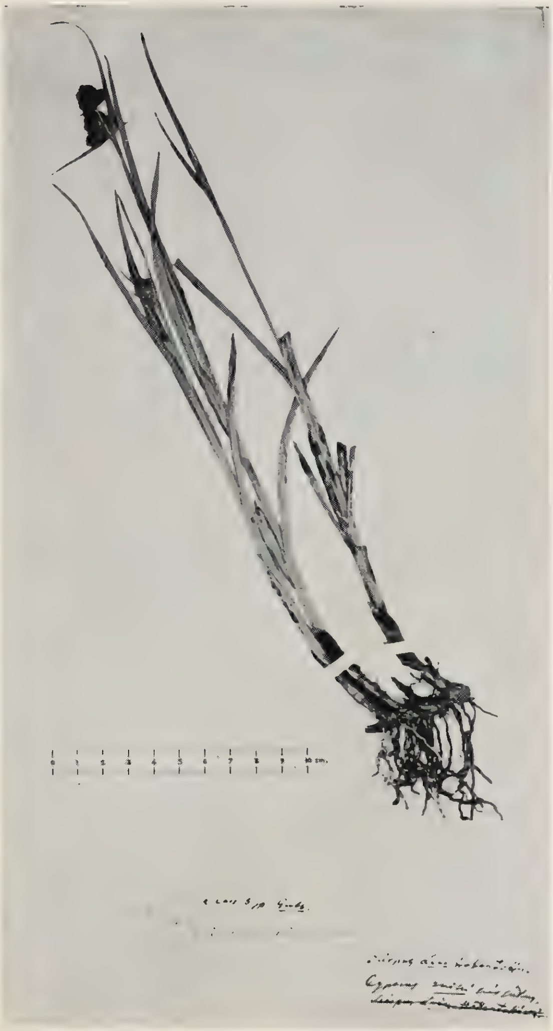

FIG. 1: *Fuirena hirsuta* (Berg.) P. L. Forbes, type specimen in the Bergius Botanic Garden Herbarium, Stockholm.

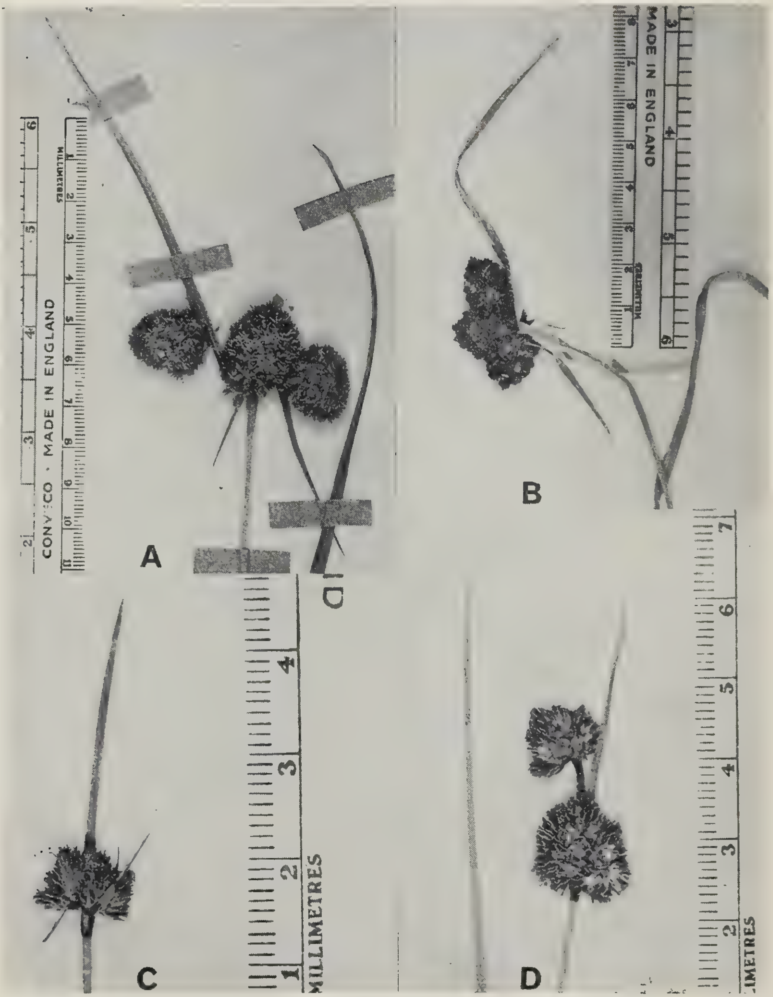

FIG. 2: *F. hirsuta*, variation in inflorescence, apical heads only shown: A—one sessile, two pedunculate (*Parker* 3624); B—three subsessile (*Hilliard* 2564); C—one sessile (*Gordon-Gray* 4760); D—one sessile, one pedunculate (*J. L. Gordon-Gray* 1102).

about 1·3 mm long including beak and stalk, broadly obovate, triquetrous, dark yellow, base acute, smooth or papillate, merging into slender stalk about 0·3 mm long; beak elongate, about 0·3 mm long, cylindrical, papillate, papillae elongate numerous, sometimes few and short, rarely absent: *outermost cells to pericarp* over broad faces of achene, transversely elongate with dovetailing end walls, arranged in fairly regular longitudinal rows, anticlinal walls rippled; longitudinally elongate at angles of achene, square over beak, square to longitudinally elongate over stalk.

Type: Deposited in the Bergius Botanic Garden Herbarium, Stockholm. The specimen, bearing the inscription "Cyperus mihi hirsutus" in Bergius' handwriting, consists of a portion of rhizome bearing three culms; the longest is about 30 cm and has an inflorescence of two terminal heads. The glumes are densely hirsute, and the flowers very young. The locality is given as "e Cap. b. sp." It was sent to Bergius by Michael Grubb, a former director of the Swedish East India Company, who visited the Cape in 1764. Possibly Grubb did not collect the material himself; he may have received it from J. A. Auge.

TRANSVAAL. Barberton distr: Louw's Creek, *Wager* s.n. (PRE).

SWAZILAND. Pigg's Peak distr: Komati R., *Connolly* s.n. (NU).

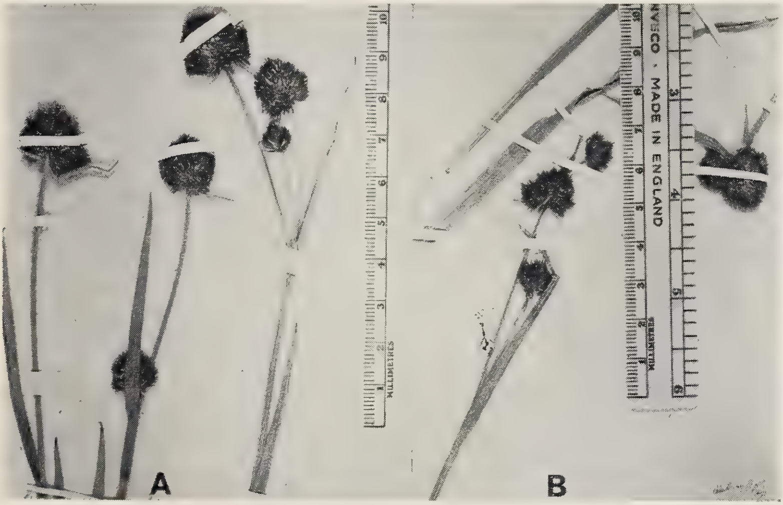

FIG. 3: *F. hirsuta*, variation in inflorescence, apical and lateral heads included: A—three stems showing (left) single apical head, (centre) single apical and one lateral head, (right) single apical and two lateral heads (*Duthie* 149); B—(centre) one sessile and one pedunculate apical head with one lateral head added (*Pearson* 5228).

Mozambique. Sul do Save: Namaacha, *Myre & de Carvalho* 142 (NU, SRGH); *Balsinhas* 505 (PRE).

Natal. Ngotshe distr: Ngotshe bank of Nkuzana R. on Nongoma-Magudu rd., *Gordon-Gray* 4760 (NU); Hlabisa distr: Hluhluwe Game Reserve, *Ward* 2107 (NU, NPGF); Lower Umfolozi distr: Ntambanana, *Salberg per Curzon* 15 (PRE); Mtunzini distr: Port Durnford, *Ward* 3476 (NPGF); do., *Venter* 1842 (ZU); Ngoye mt. Ubisana valley, *Venter* 1589 (ZU); Camperdown distr: Shongweni Dam, *Morris* 826 (NU); Durban distr: Isipingo Beach, *Ward* 753 (NU); Umzinto distr: near Scottburgh, *Gordon-Gray* 6134 (NU); Port Shepstone distr: in bed of Umzimkulwana R., Oribi Gorge, *Hilliard* 2564 (NU).

Cape Province. Umzimkulu distr: Bisi, *Medley Wood* 3144 (NH); Bizana distr: 7 miles SSW of Bizana, *Acocks* 13407 (PRE); Elliotdale distr: Gwebe forest, The Haven, *J. L. Gordon-Gray* 270; 1102 (NU); Kentani distr: marshes, Kentani, *Pegler* 341 (BOL); Komgha distr: near Kei Mouth, *Flanagan* 1005 (PRE, GRA, BOL, SAM); Cathcart distr: Fort Cunynghame, *Sim* 2712 (PRE); East London distr: "Overton", 11 miles W of East London, *Hilner* 186 (GRA); Bonza Bay, *Acocks* 9556 (PRE); East London, *Rattray* 811 (GRA); Albany distr: Howieson's Poort, *Britten* 976 (GRA, PRE); hill near Grey Reservoir, Grahamstown, *Gane* 67 (GRA); Featherstone Kloof, Grahamstown, *Lubke* 68 (NH); Bathurst distr: Trappe's Valley, *Daly* 697 (GRA, BOL); Alexandria distr: Boesmansriviermond, *Edwards* 198 (NU); Port Elizabeth distr: Walmer, *Paterson* 2370 (GRA, BOL); Uitenhage distr: Uitenhage, *Paterson* 1925 (GRA); Swartkop R., *Zeyher* 4369b; 185; 168 (BOL); 361 (SAM); Hankey distr: Otterford Forest Reservc, *Rodin* 1153 (PRE, BOL); Humansdorp distr: 9·3 miles W by N of Kareedouw, *Acocks* 20032 (PRE); Assegaaibos Sta. on slopes towards Kromme R., *Schonland* 3061 (GRA); Humansdorp, *Rogers* 2912 (GRA, SAM); flats, Oudebosch, *Fourcade* 958 (GRA); Kouga R. on road from Zuur Anys, *Fourcade* 3104 (GRA); Uniondale distr: Uniondale, *Esterhuysen* 16419 (BOL); Knysna distr: "Vlugt", *Bolus* 2500 (BOL); Portland, *Duthie* 916 (GRA); Buffalo Bay, *J. Phillips* 24 (GRA); George distr: Swart R. gorge, *Acocks* 21239 (PRE); George, *Rogers* s.n. (PRE); Riversdale distr: Riversdale at Waterval, *Muir* s.n. (GRA); near Langeberg, *Muir* 2871 (PRE, GRA); Laingsberg distr: Seven Weeks Poort, *Thorne* s.n. (SAM 50151); Swellendam distr: National Bontebok Park, *Liebenberg* 6681 (PRE); Montagu distr: Keurkloof near Montagu, *Lewis* and *Esterhuysen* s.n. (BOL 27945); Robertson distr: *McGregor*, *Esterhuysen* 4903 (BOL); Ceres distr: Visgat, between Schurfteberg and Great Winterhoek Mountains., *Stokoe* s.n. (SAM 66588); Worcester distr: Matroosberg, *E. P. Phillips* 2111 (SAM); Hex R. valley, *Tyson* 618 (GRA); s.n. (SAM 12642); Worcester, *Ecklon* and *Zeyher* s.n. (GRA); do., *van Breda* 370 (PRE); Caledon distr: near Palmiet R., *Bolus* 4227 (BOL); Hagelburg Pass, *Compton* 23686 (NBG); Hermanus distr: Hermanus, *Rogers* s.n. (PRE);

Tulbagh distr: in hills near Saron, *Schlechter* 600 (PRE, GRA); Wellington distr: Witte R. valley, Wellington, *Thorne* s.n. (SAM 46506); Paarl distr: du Toit's Pass, *Werdemann* and *Oberdieck* 738 (PRE); French Hoek, *E. P. Phillips* 1371 (SAM); Stellenbosch distr: Stellenbosch, *Duthie* 149 (BOL); Kuils R., *Zeyher* 4369a (BOL); Somerset West distr: Somerset West, *Parker* 3624 (PRE, NBG); Sir Lowry's Pass, *Maguire* 1065 (NU, NBG); Cape Town distr: Camps Bay, *Marloth* s.n. (PRE); Devil's Mt., *Ecklon* 34; 881; 882 (PRE); Wynberg distr: Cape Flats near Princess Vlei, *MacOwan* 3136, Herb. Afr. Cent. 18 1796 (SAM); Princess Vlei, *Forbes* 354, 366 (NU); roadside beyond Camp Ground, *Wolley Dod* 2203 (BOL); Kirstenbosch, *Wolley Dod* 2362 (BOL); Doornhoogte on the Cape Flats, *Zeyher* s.n. (PRE); Cape Flats at Hout Bay (*sic*), *Zeyher* 24 (SAM); Simonstown distr: Schuster's Bay, *Kies* 161 (NBG); Malmesbury distr: Mamre hills, *Wasserfall* 962 (PRE); Piketberg distr: farm "Waboom", slopes of Zebrakop, *Taylor* 5354 (PRE); eastern side Pickenier's Pass, *Pearson* 5228 (BOL); Clanwilliam distr: Waterfall, Citrusdal, *Maguire* 1064 (NBG).

The selection of specimens for citation and the herbarium abbreviations used, are as in previous papers in this series (Gordon-Gray 1966), with the addition of ZU for Zululand University College Herbarium, via Empangeni, Zululand.

F. hirsuta occurs in damp situations in the coastal region of Southern Africa. All plants studied were collected between Louw's Creek (eastern Transvaal) and Citrusdal (western Cape Province.) Clarke (1898) cites a Drège gathering from Clanwilliam which extends the range slightly further north-west than indicated here: this material has not been examined. Eyles (1916) and Brain (1934) mention a single specimen collected by Engler at the Victoria Falls. This material, which was housed in the Berlin Museum, has been destroyed. As it occurred so far out of the known range, it was possibly incorrectly identified.

It is unlikely that *F. hirsuta* occurs outside Southern Africa, although a plant from the Bosphorus, described as "Juncus hirsutus, foliis articulatis", by Buxbaum (1729) was cited under *Cyperus hirsutus* by Kunth (1837), and under *F. glabra* by Clarke (1894, 1898). Buxbaum's description and illustration are not clear enough to identify his plant as *Fuirena* nor has any type been located so far. Since no *Fuirena* has been recorded from the Bosphorus area (although *F. pubescens* Kunth does occur in Europe, the Lebanon and south-west Turkey), it seems likely that Kunth's and Clarke's citations were in error.

There is a distinct difference in appearance between plants from the south-western and north-eastern limits of the distributional range of *F. hirsuta*. Those from the western Cape Province have a dense mass of bristles on the abaxial surface of the glumes (Fig. 5A, H) so that the inflorescences are hirsute. In Natal and Zululand, glume bristles are few or absent, and when present

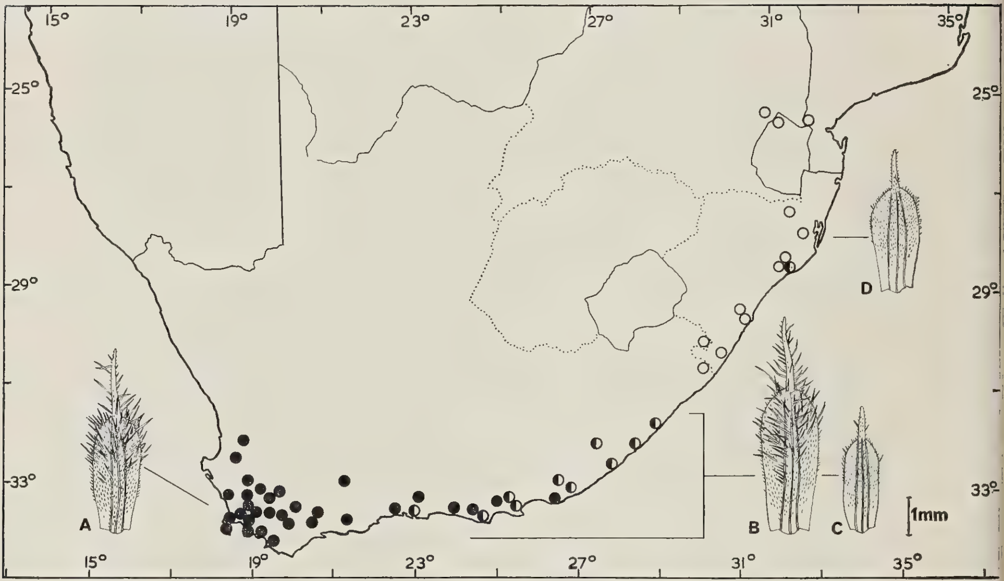

FIG. 4: *F. hirsuta*, distribution in Southern Africa: ●—plants with glumes hirsute; ◐—plants with glume bristles varying from many to few or absent, in different or in the same gatherings; ○—plants with glume bristles varying from few to absent in the same spikelet: A, B, D—glumes near spikelet base, abaxial surface; C—glume near apex of spikelet abaxial surface; A—*Forbes* 366; B—*Gane* 67; D—*Morris* 826; C—*J. L. Gordon-Gray* 270.

these are usually not as long as in typical Cape material (Fig. 5F, G). These two forms have previously been regarded as *F. hottentotta* (L.) Druce and *F. glabra* Kunth, respectively. But in the eastern Cape and Transkei there is considerable variation in the density of glume bristles; here the south-west and north-east types grade into each other, and there is no clear discontinuity between them. In this region, plants occur with numerous bristles as in the western Cape (*Gane* 67), or the glumes may be less hairy as in Natal and further north (*Lubke* 68). There are also instances where whole inflorescences may be hirsute, or less hairy, within a single gathering (*Hilner* 186, *Britten* 976), and intermediates in which bristles on the glumes vary from quite numerous to absent within a single spikelet. Generally, in such intermediates, decrease in number of bristles per glume takes place from spikelet base to apex (Fig. 5C, D, E).

Variability is most evident in the area between Uitenhage and Bashee River mouth, but it may occur both further north and south. *Ward* 3476 and *Venter* 1842 (Port Durnford, Zululand) have numerous bristles on the glumes, while *Fourcade* 3104 (Humansdorp) and *J. Phillips* 24 (Knysna district) have glumes with few bristles.

There is some degree of correlation between glume and culm indumentum. Generally, when bristles of the glumes are few or absent, culms are glabrous, while plants with densely hirsute glumes have a hirsute area at the culm apex immediately below the inflorescence, the remainder of the culm being more sparsely hirsute or glabrous. In plants showing variation in density of glume

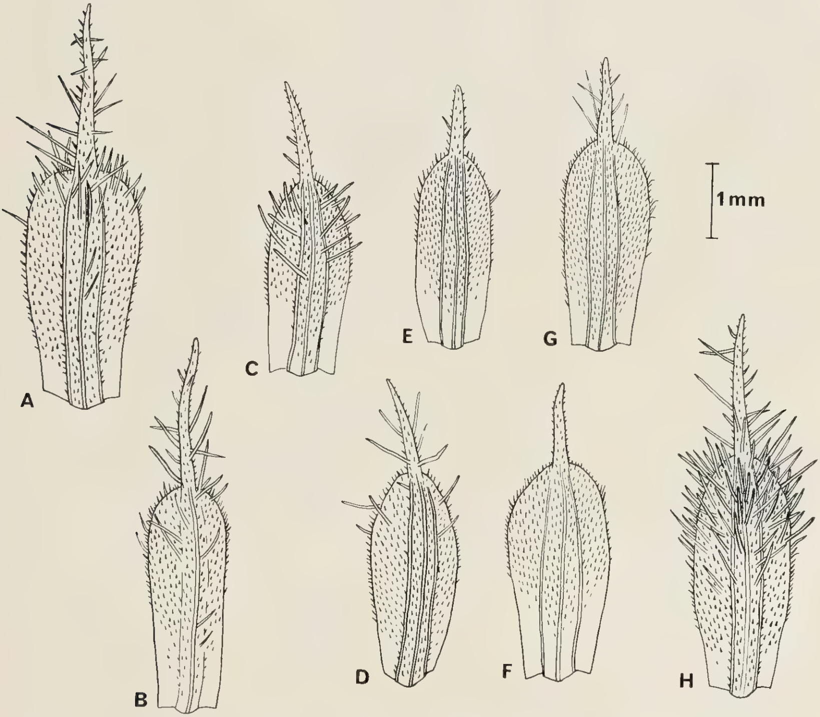

FIG. 5: *F. hirsuta*, abaxial surface of fertile glumes showing variation in indumentum. A, B, F–H—glumes near base of spikelet; A—Parker 3624 (Somerset West distr.); B—Britten 976 (Albany distr.); F—Morris 826 (Camperdown distr.); G—Balsinhas 505 (Sul do Save); H—Forbes 366 (Wynberg distr.); C, D, E—J. L. Gordon-Gray 270 (Elliotdale distr.); C—glume near base of spikelet; D—glume half way up spikelet; E—glume near apex of spikelet.

bristles, the culm apex may be glabrous or villous, or both conditions may occur in a single gathering (*Hilner* 186).

Leaf sheath and blade indumentum also show variability. Frequently, sheaths at the culm base are hirsute: higher up, hairs are absent from the lower portion of each sheath, the glabrous areas becoming progressively more extensive, until the uppermost sheaths have only a small distal patch of hairs, or are entirely glabrous. However, examples occur in which leaf sheaths are hirsute or glabrous throughout the plant. Leaf blades vary from hirsute to practically glabrous. Blade hairs are frequently marginal only; these may be very sparse so that large portions of the lamina are glabrous, but no plant with blades devoid of hairs was found.

Plants with all culm leaf sheaths hirsute have been found only in the south-western portion of the distributional range, and while plants with hirsute blades are similarly distributed, not every plant from this south-western region has these characteristics. Thus, while there is some correlation between density of glume and culm indumentum, the relationship does not hold for leaf sheath and leaf blade indumentum also. Nevertheless, there is a general tendency for the indumentum of abaxial glume surface, culm internode, leaf sheath and blade to be densest in the south-western, and sparsest in the north-eastern regions of the distributional range.

Kunth used terete as opposed to triangular culms as one character of *F. glabra*, but examination of a large number of specimens has shown this to be variable. Terete culms have ridges corresponding to the angles of the triangular stems, while the angles of the latter are often not sharp. Thus it is sometimes difficult to decide whether a culm is terete or triangular: there may also be variation in shape at different levels on the same culm, or two culms on the same rhizome may differ at the same level. Kunth gave Ecklon 882 as the type of *F. glabra*, but the sheet of this number examined (PRE) has a triangular stem: possibly other sheets of the same number have more terete culms. There is a general tendency for plants from the northern end of the distributional range to have rather slender and wiry, more or less terete culms, while those of south-western plants are stouter and more clearly triangular.

Variation in the shape and size of bristles and scales in the mature flower is shown in Fig. 6. Bristle length forms a series from less than that of the scale claw, to about two and a half times the length of the scale. Flowers with very long bristles are comparatively rare: usually bristles are about half the length of the scale or shorter. There may be some variation in bristle length in a single flower (Fig. 6C, D), but the extremes in length were never found together, nor was there correlation between bristle length and the nature of the indumentum of glumes and vegetative organs. Bristles are occasionally slightly expanded near the base (Fig. 6B, D), and they vary in texture from stiff, and slightly

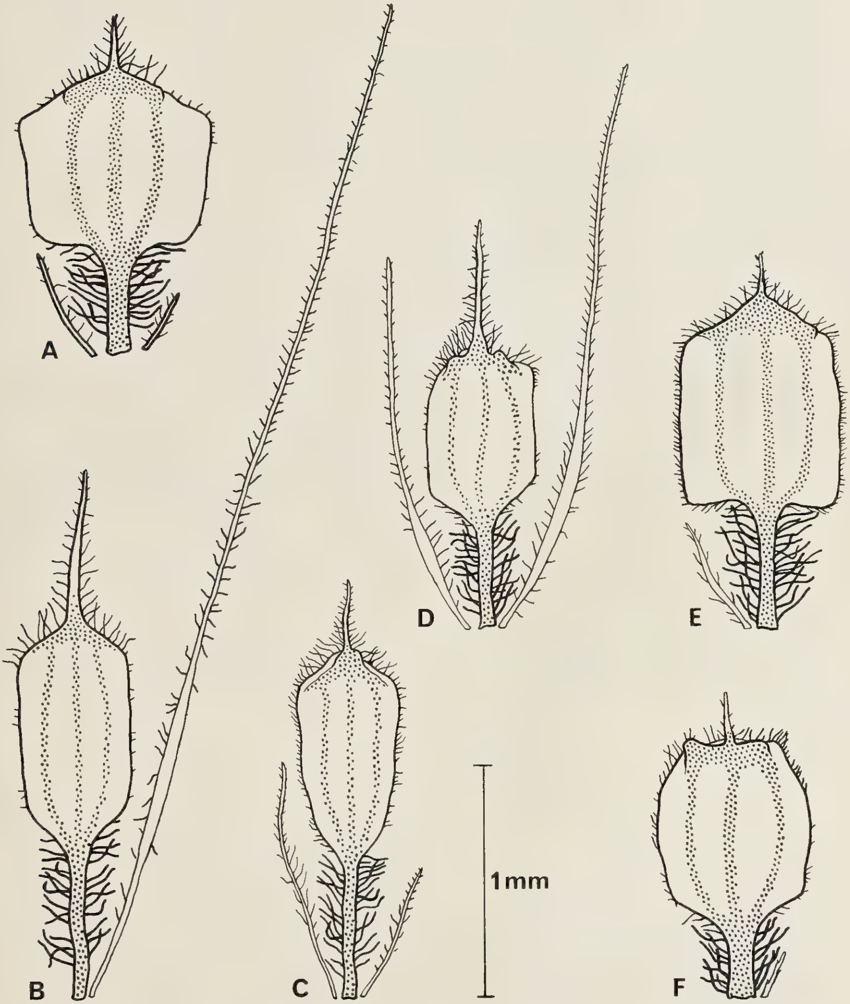

FIG. 6: *F. hirsuta*, A—F variation in size and shape of scales and bristles in mature flowers. A—Hilliard 2564; B—Ward 3476; C—Paterson 2370; D—Acocks 9556; E—Ecklon 882; F—van Breda 370.

spreading, to soft and delicate. Some authors (Schrader 1832, Nees 1835–6, Boeckeler 1871–3, Schonland 1922) have stated that bristles may be absent, but this is more infrequent than previously realised. Bristles are easily overlooked: in very young flowers, they adhere to the filaments, and in older material, if short and delicate, they are difficult to distinguish among, and to separate from, the hairs of the scale claws. In this investigation, bristles were found to be lacking only in *Werdemann* and *Oberdieck* 738. In *Phillips* 2111, they are exceedingly short. Consistent characteristics of the scales are the dense curling hairs on the claw, and the straight hairs on the blade apex and awn. The lateral margins of the blade are usually ciliate, but sometimes the hairs are sparse, and the margins almost smooth.

Changes occur in the appearance of bristles and scales with development. In very young flowers, bristles lack hairs, but these develop before the flowers are fully mature. The young scales are small, delicate, sessile and obovate, with a distinct but smooth spiculum. A little later, there is development of a more slender basal portion, the future claw, and the apiculum elongates to form the awn. With further lateral growth of the broad distal portion of the scale, the mature form is gradually assumed. Nerves can be seen at about the same time as a difference between blade and claw appears. Hairs on the blade apex and awn develop early, but hairs on the claw and on the lateral margins of the blade are not seen before the scale has more or less assumed the mature shape.

Because there is uncertainty about the true nature of bristles and scales (Blaser 1941, Holttum 1948, Kern 1962), the use of the term "perianth" in connection with these structures has been avoided.

The achene is characteristic of the species, being distinguished by a long slender stalk and long cylindrical beak (Fig. 7). The beak usually bears numerous elongate papillae, but occasionally the papillae are few and short, or rarely the beak is quite smooth. Papillae are usually present also on the ovary shoulders. Elongate or short round papillae may be present at the apex of the stalk, or this may be smooth. The characteristic beak develops when the ovary is still very young and slender, but the stalk is distinct only later, as the ovary becomes swollen. The rippled anticlinal walls of the pericarp epidermal cells (Fig. 7F) can usually be seen clearly only when the epidermis is detached from the pericarp.

In the middle of the nineteenth century, *F. hirsuta* was regarded as consisting of four species, namely *F. hirta* Vahl, *F. erioloma* Nees, *F. glabra* Kunth and *F. intermedia* Kunth. (*F. cephalotes* Schrad. was sunk into *F. hirta* by its author in 1832.) These species differed from each other in very minor respects. Inconsistencies in descriptions, and contradictions in citation of specimens show that they were not good species, and that there was misunderstanding about

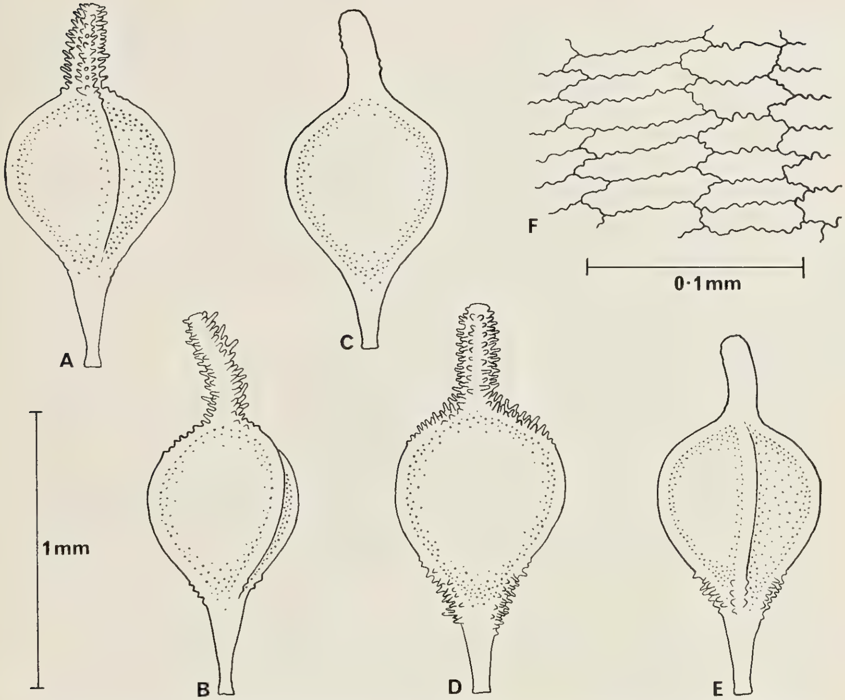

Fig. 7: *F. hirsuta*, A—E variation in the achene. A—Hilliard 2564; B—Liebenberg 6681; C—Werdemann & Oberdieck 738; D—Forbes 354; E—Tyson s.n. (SAM 12642). F—pericarp epidermal cells, Liebenberg 6681.

their exact limits. Boeckeler (1871–3) included *F. erioloma* in *F. hirta*, and in 1894, Clarke sunk both *F. erioloma* and *F. intermedia* into *F. hirta*, but retained *F. glabra* as distinct. The confusion was thereby partly simplified. In Flora Capensis (1898) Clarke described *F. glabra* as having "stems and leaves more than usually glabrous", and cited specimens from the Transkei and East Griqualand, although Kunth had given the locality as "cap. b. spei." *F. hirta* was described as "very hairy" and with "long excurrent midrib of the glumes long-pilose"; the citations are of specimens from the western Cape Province to Grahamstown. Thus Clarke indicated two taxa separated by degree of hairiness, and with different distributional ranges; he cited Ecklon 882 (Cape Town district) under *F. hirta* although Kunth had given this specimen as the type of *F. glabra*. Clarke's interpretation of *F. glabra* is thus different from that of Kunth.

Schonland's (1922) treatment of the plants constituting *F. hirsuta* must be mentioned. He retained *F. hirta* as a species, but sank *F. glabra* together with *F. ecklonii* Nees, *F. gracilis* Kunth and *F. pubescens* Kunth into *F. coerulescens* Steud. This is an unsatisfactory arrangement. His figure of *F. hirta* is also not entirely accurate. There are certain consistent features which connect *F. glabra* more closely with *F. hirta* than with the species linked by Schonland, namely the echinate congested heads of numerous spikelets, the woolly scale claws, the long slender achene stalks, the elongate cylindrical beak to the ovary, and the transversely elongate pericarp epidermal cells. None of these characteristics are shared by the species included with *F. glabra* as *F. coerulescens* by Schonland. *F. coerulescens* (sensu Steud.) occasionally has a congested globose inflorescence of numerous spikelets but always differs in the other characteristics mentioned. Although a great deal of variation exists within species of *Fuirena*, and as Schonland rightly mentions, caution must be shown in using the scales as a diagnostic criterion, *F. hirta* and *F. glabra* form a natural group which cannot be divided as this author has attempted.

Because of unifying characters, it is impossible to treat this group as anything other than a single species. Because of intergradation, and the fact that hirsute and less hirsute forms occur in the same locality, in the same gathering, and to some extent on the same plant, it is pointless to recognise infraspecific categories.

F. hirsuta is fairly easily distinguished from other species of *Fuirena* occurring in Southern Africa, although it may show some external similarity in inflorescence form and glume indumentum to *F. microlepis* Kunth. But in *F. microlepis* the achene does not have a long slender stalk, and the beak is shorter; pericarp epidermal cells are hexagonal or sometimes slightly transversely elongate; the scale claw is very short with few hairs or glabrous, and the scale blade is obcordate with strongly incurved margins.

Koyama (1958) does not regard *Fuirena* and *Scirpus* as separate genera, but maintains that the scales in *Fuirena* represent an evolutionary line within *Scirpus* in which the linear bristles of *Scirpus* have become expanded. He has transferred five, apparently random, species of *Fuirena* to *Scirpus*. Among these is *F. glabra*, but he appears to be unaware of the relationship between *F. glabra* and *F. hottentotta*, as he does not mention the latter. At the present time the evidence for uniting the genera seems insufficient. A thorough investigation on a world basis is necessary; this should be tackled from different aspects such as anatomy, including nature and distribution of silica bodies, and chromosome number. For this reason, the species of *Fuirena* in Southern Africa are, for the present, being retained as a distinct genus. Should the transfer to *Scirpus* be made later, the name, *F. hirsuta*, would revert to *Scirpus hottentottus* L., as the epithet "hirsutus" has already been used in *Scirpus*.

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